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The Role Of Study Strategy Use, Meaning In Life, And Grit On The Academic Success Of University Students

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THE ROLE OF STUDY STRATEGY USE, MEANING IN LIFE, AND GRIT ON THE ACADEMIC SUCCESS OF UNIVERSITY STUDENTS

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ABSTRACT

Academic achievement is important to successful developmental outcomes. Educators and academic researchers have long been interested in identifying factors that contribute to student achievement. Literature suggests that relative to students who are academically unsuccessful, students with desirable academic outcomes use more study strategies. It has also been shown that academic performance can be enhanced by teaching students study strategies. Several personal factors seem to be associated with high academic achievement. Academically successful college students perceive that they have a greater sense of meaning in their lives compared to poorly performing students. Additionally, students with greater perceived meaning in life de-value pleasure, value intelligence, responsibility, discipline, perceive that they use their time in a structured and purposeful manner, and are more engaged in the process of academic learning. High levels of grit have also been found to be predictive of higher education levels and better academic performance.

Although research has identified use of effective study strategies, high levels of meaning in life, and grit as being associated with academic achievement, relationships among academic achievement, study strategy use, meaning in life, and grit have yet to be examined. The present study investigated the role of study strategy use, meaning in life, and grit in the prediction of academic success of university students.

A sample of university students provided demographic information including GPA, and completed measures of study strategy use, meaning in life, and grit. Hierarchical regression was performed. Study strategy use, as measured by LASSI-2 scales, was entered in the first step,

meaning in life, as measured by the MLQ, was entered in the second step, and grit, as measured by the Grit-S, was entered in the third step. GPA served as the dependent variable. Results revealed that study strategy use accounted for 31% of the variance in prediction of GPA, presence of meaning in life did not account for additional variance beyond that accounted for by study strategy use, and grit accounted for additional variance (4%) beyond that accounted for by study strategies and presence of meaning in life. Implications of the data are discussed.

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I. INTRODUCTION

A college degree is associated with many desirable outcomes. Relative to individuals with a high school diploma, college graduates experience higher rates of full time employment and earn more money (Aud, Hussar, Kena, Bianco, Frohlich, Kemp, Tahan, 2011). Unfortunately, not all students who enter college succeed and earn degrees. Educators and academic researchers have long been interested in identifying factors that contribute to student achievement. Several studies suggest that consistent use of study strategies including effective use of time management, test taking strategies, and self-testing may be linked to positive academic outcomes. In general, students who use more learning strategies seem to have fewer academic difficulties (Grimes, 1995; Proctor, Prevatt, Adams, Hurst, & Petscher, 2006), better homework completion rates (Gettinger & Seibert, 2002), better academic performance (Kállay, 2012; Ruffing, Wach, Spinath, Brünken, & Karbach, 2015) and higher graduation rates (Weinstein, Husman, & Dierking, 2000).

Several personal factors also seem to be associated with high academic achievement. Students possessing positive attitudes towards school and learning, as well as high levels of motivation and low anxiety about school achievement outperform peers who are low on those indicators (Weinstein & Palmer, 2002). Similarly, students exhibiting high levels of personality characteristics such as conscientiousness (MacCann, Fogarty, & Roberts, 2012) and openness (Komarraju, Karau, Schmeck, & Avdic, 2011) have an increased likelihood of school success.

Meaning in life, the extent to which individuals perceive their lives as being meaningful or having meaning may also be related to academic success. Perceiving one's life as having a mission, significance, and purpose is what exemplifies the construct of meaning in life (Steger, Frazier, Oishi, & Kaler, 2006). Individuals with meaning in life are goal-directed. Students with a greater sense of life purpose tend to use their time in a more organized and purposeful manner (Bond & Feather, 1988). Furthermore, to perform well in school, it is vital that students set academic goals and be willing to devote their time to achieving those goals; thus having a greater sense of meaning in life seems beneficial. Moreover, personality traits have been associated with study strategy use (Kokkinos, Kargiotidis, & Markos, 2015).

Grit has been described as a personality trait that may be related to academic success (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009). High grit individuals are characterized by determination and enthusiasm for goals requiring extended effort and time to accomplish. These individuals are seen as hard working and unwavering as they pursue their interests and aspirations. They sustain focus on goals over long periods of time regardless of difficulty associated with achieving goals (Duckworth et al., 2007). It has been found that honors students compared to non-honors students possess more grit (MacCann & Roberts, 2010).

The purpose of the present research was to examine relationships among academic achievement, study strategy use, meaning in life, and grit. Following an examination of the relationship between study strategy use and academic outcomes, the construct of meaning in life and its role among college students will be discussed. Lastly, grit and its relationship to developmental outcomes will be presented.

Study Strategy Use and Academic Outcomes

Effective study strategies are intentional, effortful behaviors and activities used to facilitate learning (Gettinger & Seibert, 2002; Nist & Holschuh, 2000; Weinstein et al., 2000; Weinstein & MacDonald, 1986). Examples of study strategies include effective time management, test taking strategies, and self-testing. Students with good time management skills, set school goals, and allot sufficient time for studying and completing school assignments. Exam day test taking strategies include reviewing answer responses on an exam. Furthermore, utilizing effective self-testing skills might include checking one's comprehension periodically while reviewing class notes or reading a class textbook (Weinstein & Palmer, 2002).

Much research has been devoted to examining the role of the use of study strategies on school success. Albaili (1997) surveyed low, average, and high achieving college students on their use of learning and study strategies. Results indicated that average and high achievement students used more learning and study strategies than low achievement students. In particular, high achieving students reported using more time management skills, study aids, self-testing techniques, test-taking strategies, information processing techniques, and strategies for selecting main ideas. High achieving students also displayed better attitudes towards school, higher motivation, less anxiety about school, and more concentration on schoolwork. It was suggested that relative to low achieving students, average and high achievement students appeared to be putting their academic achievement in their own hands and taking initiative by utilizing more study strategies, which seemed to contribute to school success. Similar results were reported by Marrs, Sigler, and Hayes (2009) and Yip and Chung (2002, 2005).

Proctor et al. (2006) surveyed successful college students and students having academic difficulties (e.g., students with grade point averages under 2.5, students referred for psychoeducational evaluations) on their use of learning and study strategies. Results revealed

that students having academic problems were similar in the amount of learning and study strategies they used, employing fewer strategies compared to students not having difficulty in their school work.

The influence of use of study strategies for academic success has also been studied with college students who represented different levels of risk for academic difficulty or college drop-out. Grimes (1995) categorized college students as being at low-risk if they were pre-med majors or/and honors students, at general-risk if they were entering students, and at high-risk if they had less than a 2.0 grade point average, a learning disability, referred for their academic problems, or were athletes. Participants were administered a self-report measure of learning and study strategy use. Results revealed that relative to high risk students, low-risk students used more learning and study strategies (e.g., time management skills, study aids, self-testing techniques, test-taking strategies) and displayed higher motivation, less anxiety about school, and more focus on schoolwork.

Kovach and Wilgosh (1999) surveyed students who had learning disabilities, including those who were academically successful and those who were on academic probation. Participants were administered a self-report measure of learning and study strategy use. Results demonstrated that relative to academic probation students, successful students engaged in significantly more time management strategies and had higher motivation for school. Similar results have been reported by MacCann et al. (2012), Nist, Mealey, Simpson, and Kroc (1990), and Schumacker, Sayler, and Bembry (1995).

Alkhateeb and Nasser (2014) surveyed Arab undergraduate students on their use of learning and study strategies. Correlational analyses revealed that learning and study strategies were positively associated with students' GPA's. In particular, using more time management

skills, self-testing techniques, test-taking strategies, information processing techniques, and strategies for selecting main ideas was associated with higher GPA. Additionally, better attitudes toward school, higher motivation, less anxiety about school, and more concentration on schoolwork was associated with higher GPA. The researchers also divided their sample into low and high achieving groups by dividing the sample at the median of the sample's GPA. Results revealed that the high achievement students used more learning and study strategies (i.e., more self-testing techniques, strategies for selecting main ideas, time management skills, and test-taking strategies and displayed better attitudes toward school, higher motivation, less anxiety about school, and more concentration on schoolwork) than the low achievement students. The researchers also utilized multiple regression analysis and found that learning and study strategies predicted GPA (R^2 = .13, adjusted R^2 = .11). More specifically, the use of more test-strategies and having less anxiety about school was predictive of higher GPA. Similar results have been reported by Cano (2006), Carson (2011), Dugan and Andrade (2011), Gadelrab (2011), Magno (2011), Ning and Downing (2010a, 2010b), and Seabi (2011).

Fleming (2002) introduced learning strategies (during the first three days of class) to students in one introductory psychology class, and had students set goals to use the strategies and record their actual use of the strategies (from the second day of class until the end of the class' second unit, with the exception of exam days). Experimental participants were given instructions regarding strategies for reviewing class notes (first day of class), reading the textbook and self-testing on the content (second day of class), and studying course information (third day of class). Another introductory psychology class served as the control group. All students were tested on class material unit tests. Compared to the freshmen control group, students in the experimental group achieved higher exam scores. Moreover, improvements in performance for the control

group were observed on exam performance after control students were introduced to learning strategies. Similar results have been reported by Tuckman and Kennedy (2011), with students who took a learning strategies class earning higher GPA's and having higher retention and graduation rates compared to a matched control group who did not take the learning strategies class.

The above literature suggests that relative to students who are academically unsuccessful, students with desirable academic outcomes use more study strategies. The relationship between study strategy use and academic achievement also appears to be observed across many student populations, with those who use more strategies having better outcomes. Moreover, data suggest that academic performance/outcomes can be enhanced by teaching study strategies to students.

Meaning in Life

The construct of meaning in life is central to the philosophy and existential therapeutic orientation of logotherapy. Developed by Viktor Frankl during his concentration camp imprisonment during the Second World War, he suggested that individuals who found a purpose to live, or meaning for their lives and traumatic experiences, dealt with horrific imprisonment better than individuals without such meaning (Starck, 2003). He argued that individuals have a drive to have meaning in life, with the will to choose, enabling individuals to perceive that the world has order in spite of their trying situations.

Logotherapy views meaning-making as paramount to human development and it is said that each individual plays an active role in his or her own search for meaning (Frankl, 1986, 1997, 2006). “The foundation of logotherapy rests on three assumptions: (1) Life has meaning under all circumstances; (2) people are motivated by a will to meaning; and (3) humans have free will, within obvious limitations, to find meaning in their lives” (Frankl, 1969, as cited in Lukas

& Hirsch, 2002, p. 334).

More specifically, the construct of meaning in life refers to the extent to which individuals identify their lives as being meaningful or having purpose (meaning). Individuals with meaning in life are goal-directed. They perceive their lives as having a mission, significance, and purpose (Steger et al., 2006). Having meaning in life is viewed as having "awareness that there is an order in the universe despite chaos, destruction, and injustice, and each human being functions within this arena" (Lukas & Hirsch, 2002, p. 339). Finding what is important to an individual gives him or her a sense of completeness. It helps the individual identify his or her purpose or place in the world (Ososkie & Holzbauer, 2004; Starck, 2003).

Free will is also essential to the theory of logotherapy. It refers to individuals' freedom to decide their actions and attitude in a given situation. Thus, individuals can choose varying levels of functional and dysfunctional ways to act in a given situation and then assume responsibility for their actions. Likewise, even in challenging situations, individuals choose to move forward with a positive or negative attitude (Deurzen-Smith, 1997; Frankl, 1986, 2006).

A lack of purpose or meaning in life, an existential vacuum, is also a concern in logotherapy. Existential vacuum may occur due to boredom, and may result in feelings of apathy, emptiness, or unhappiness (Lukas & Hirsch, 2002; Starck, 2003). Those with meaninglessness do not believe that what they are doing in life is important (Maddi, 1967). However, when individuals pursue that which is of real interest to them, they no longer experience boredom (Drob & Bernard, 1987).

Although Frankl believed that meaning is important in all areas of life, Frankl was especially concerned that young individuals may fall victim to a lack of purpose or meaning in their lives mostly due to unaccomplished educational goals (Lukas & Hirsch, 2002). Meaning

has been found to be relevant in education (DuBois, 2007). It has been reported that 89% of college students report that they are searching for meaning (Greenway, 2006); thus, meaning seems to be an important factor in college students' lives.

Meaning in Life among College Students

Research has examined the role meaning in life plays on college students' development. Mason (2013) surveyed first year college students at a university in South Africa on their meaning in life using quantitative data (Life Purpose Questionnaire; LPQ) and qualitative data (students' written responses to questions regarding their meaning in life). The LPQ data revealed that 16.76% of students reported that their sense of life meaning was low, 59.78% reported that they have an uncertain definition of their meaning in life, and 23.46% reported a definite sense of life meaning. The author suggested that the students with low meaning may be experiencing emotional distress and those with an uncertain definition of their meaning may be searching for life meaning. In addition, content analysis of the qualitative data revealed that education was an important source of life meaning for the students.

Zhang, Sang, Chan, Teng, Liu, Yu, and Tian (2015) surveyed Chinese college students on their life meaning. A content analysis of students' essay responses to questions regarding what gives their lives meaning revealed that the students' most frequently reported source of life meaning was associated with pursuing goals and striving to achieve. Some other sources of life meaning that were noted by students involved activities such as thinking, reading, and appreciation of arts and music.

Simmons (1980) surveyed college students using measures assessing meaning in life and valuing (e.g., what an individual values, the extent to which an individual's values are satisfied/carried out including past, current, and later satisfactions). Results revealed that

students' meaning in life was not correlated with their past quality of life, but was correlated with present-day satisfaction and long-term goals. That is, students perceived their lives as meaningful based on their current existing satisfactions and their later goals for their lives without regard to their past situations. Meaning in life was also related to students' focus on being intelligent, responsible, disciplined, and their de-valuing pleasure.

Bond and Feather (1988) surveyed college students on their meaning in life and the way that they spend their time. Participants were administered the Purpose in Life Test (a measure of meaning in life) and the Time Structure Questionnaire (assesses the extent to which one perceives that he or she uses his or her time in a structured and purposeful manner). Results revealed that a greater sense of meaning in life was related to using one's time in a more structured and purposeful manner.

Machell, Kashdan, Short, and Nezlek (2015) surveyed college students on their daily perceived meaning in life, daily experiences of positive achievement events (achieving a desirable goal), and daily experiences of negative achievement events (failing to achieve a goal). Results revealed that more daily experiences of positive achievement events was associated with greater perceived daily meaning in life and more daily experiences of negative achievement events was associated with less perceived daily meaning in life.

Greenway (2006) surveyed university students in their junior and senior years on several variables including the presence of meaning in life (knowing that one's life has meaning, value, and something to contribute), spirituality (the search for purpose, meaning, and a sense of belonging and the development of personal values and beliefs), school success (cumulative grades/GPA and students' self-reported increases in learning since college), academic engagement (the degree to which students intentionally and willingly participate in the process of

learning and find it of significance and importance to the extent that the interest and pleasure of learning surpass the effort necessary to learn), and campus involvement. Results of a path analysis investigating the relations among these variables revealed that spirituality had a direct relationship with meaning in life and an indirect relationship with academic engagement and school success. Meaning in life had a direct relationship with academic engagement and an indirect relationship with school success. Academic engagement explained 39% of the variability in students' grades/GPA and 18% of the variance in students' self-reported increases in learning since college. Meaning in life explained 24% of the variance in academic engagement in path models with both grades/GPA and student-reported increases in learning as the outcome variable. Spirituality explained 25% of the variance in meaning in life in the cumulative grades/GPA model and 28% of the variance in meaning in life in the student-reported increases in learning model. It was suggested that college students who are seeking a sense of meaning in life may not get engaged in their academics until they actually find meaning in their lives; that is, it is the presence of meaning in life, not the search for meaning, that leads students to become engaged in the process of academic learning.

Research has also examined the role of meaning in life on school success. Nackord (1983) surveyed low achieving (students with low class performance who received remedial help) and high achieving (graduating class of registered nursing students, all having high class performance and many being honors students) college students on their meaning in life. Results revealed that high achievement students reported having more meaning in life than low achievement students.

The above literature suggests that relative to low achieving students, college students who are academically successful perceive that they have a greater sense of meaning in their lives.

Moreover, students seem to derive meaning from several sources (e.g., education, thinking, reading, appreciation of arts and music). Data also suggests that students' meaning in life is associated with their current satisfactions, achievements, and long-term life goals. Additionally, relative to students with less perceived meaning in life, students with greater perceived meaning in life de-valued pleasure but valued intelligence, responsibility, and discipline, perceived that they used their time in a more structured and purposeful manner, and were more engaged in the process of academic learning, all of which seem beneficial to academic success.

Grit and Other Constructs and Positive Outcomes

Grit has been described as a personality trait that characterizes individuals who are persistent in their efforts at pursuing long-term interests. Grit involves working hard toward difficult goals. Individuals high in grit are determined and enthusiastic regarding achieving these goals. They are unwavering as they pursue their interests and aspirations. They sustain focus on their goals over long periods of time regardless of difficulty, effort, and time associated with achieving their goals. High grit individuals continue to pursue their goals in the face of obstacles, and are said to have staying power, endurance, and fortitude (Duckworth et al., 2007).

Research suggests that grit is related to many characteristics and outcomes. Kleiman, Adams, Kashdan, and Riskind (2013) explored the relations among grit, meaning in life, gratitude, suicidal ideations, and depression. Using a college student sample, measures assessing these variables were completed online (Time 1) and again after about four weeks (Time 2). Correlations revealed that all of the variables were correlated in the manner expected. For example, grit (Time 1) was positively correlated with meaning in life at Time 1 and 2 (r = .38 and .21, respectively) and with gratitude (Time 1) (r = .44) and negatively associated with suicidal ideation at Time 1 and 2 (r = -.37 and -.28, respectively) and depressive symptoms at

Time 1 and 2 (r = -.42 and -.35, respectively).

In a series of studies, Duckworth et al. (2007) examined the relationships among grit, several personality traits, and frequency of career change. Adults (25 years of age and older) participated in the online study. Participants completed measures of grit and the Big Five Inventory. Participants were also asked to report demographic information, and how many times they had changed careers. Correlations revealed that grit was positively correlated with conscientiousness (r = .77), agreeableness (r = .24), openness to experience (r = .14), extraversion (r = .22), and negatively correlated with neuroticism (r = -.38). Binary logistic regression of grit, Big Five traits, and age on low versus high career frequency change indicated grit as being the only predictor of career change, with those with more grit having a smaller likelihood (i.e., 35% less of a likelihood for individuals a standard deviation above the sample's grit average) of being a person with a high number of career changes, suggesting evidence that those with more grit do not change careers as often as those with less grit. Similar results were reported by Duckworth and Quinn (2009).

Using a sample of West Point military cadets, Duckworth et al. (2007) examined the relationship of grit to several variables including first summer training retention. Participants were administered measures of grit and conscientiousness. Records of participants' Whole Candidate Score (a composite score of rank in high school, SAT score, leadership roles in extracurricular involvement, and physical exercise performance), and summer training retention were also obtained. Grit was positively correlated with conscientiousness (r = .64), and predictive of summer training retention. Furthermore, when grit, Whole Candidate Score, and conscientiousness were entered in a binary logistic regression analysis to predict retention, only grit was a significant predictor. Similar results were reported by Duckworth and Quinn (2009).

Duckworth et al. (2007) examined the role of grit in predicting first summer training retention, subsequent first year military performance, and first year academic performance. Freshman military cadets at West Point were administered measures of grit and self-control. Records of participants' Whole Candidate Score, whether or not they completed their first summer training, subsequent first year military performance (military activity performance ratings and grades in military classes), and first year academic performance (i.e., first year academic GPA) were also obtained. Grit was positively associated with self-control (r = .63). In a binary logistic regression using grit, Whole Candidate Score, and self-control as predictors of summer training retention, only grit was a significant predictor of retention. The authors suggested that as opposed to leaving West Point and pursuing a degree from a traditional college, summer training retention at West Point requires determination and endurance reflected in high levels of grit. Also analysis revealed that grit, Whole Candidate Score, and self-control were predictive of first year military performance (r = .19, .42, .21; respectively). More importantly, analysis revealed that grit was a significant predictor of military performance (partial r = .09) after holding self-control and Whole Candidate Score constant. Analysis also revealed that grit, self-control, and Whole Candidate Score were predictive of academic grade point average (r = .06, .13, .64; respectively).

In a sample of military cadets, Maddi, Matthews, Kelly, Villarreal, and White (2012) examined the relationship of grit to several variables including first year basic training retention. Participants were administered measures of grit and hardiness (ability to learn from a challenging situation and do what is best in that situation), and records of Whole Candidate Score and subsequent first year basic training retention were obtained. Logistic regression analysis of grit, Whole Candidate Score, and hardiness on first year basic training retention revealed that all three

variables were significant positive predictors of retention. That is, according to the odds ratio [Exp(B)] for grit, cadets were 2.052 times more likely to complete their first year of basic training when grit increased one unit on the grit measure. Cadets were 1.001 times more likely to complete basic training when Whole Candidate Score increased one unit on that measure, and 1.067 times more likely to complete basic training when hardiness increased one unit on the hardiness measure. The authors asserted that grit is important in pursuing goals, and that it would be beneficial to include in the assessment of cadets entering the academy.

Grit and Academic Outcomes

Research has examined the role of grit on student academic success. Duckworth et al. (2007) examined the relationship between grit and academic performance (i.e., GPA) in a sample of college students at an Ivy League school. Results revealed that grit and academic performance were positively correlated (r = .25), with students higher in grit having higher grade point averages.

Duckworth et al. (2007) examined the relation of grit to educational attainment (education level). Adults (25 years of age and older) participated in the online study. Participants completed a measure of grit and were asked to indicate their education level and age. Results revealed that adults reporting higher education levels reported higher levels of grit than adults of the same age with lower education levels. The authors suggested that persistence (e.g., grit) with long-term goals across time allows for attaining higher education levels.

Duckworth et al. (2007) further examined the relationship between grit and educational attainment. Measures of grit, educational attainment, Big Five traits, and age were collected from adults (25 years of age and older) participating in the online study. Analysis of variance with grit as the predicted variable and educational attainment as the predictor variable, controlling for age,

revealed educational attainment predicted grit. Furthermore, when Big Five traits were entered as covariates, educational attainment continued to be a predictor of grit. That is, compared to adults who reported having had some college, those who earned degrees reported higher levels of grit after accounting for Big Five traits and age.

Duckworth and Quinn (2009) conducted an online study with a sample of adults 25 years of age and older in order to examine grit as a predictor of educational attainment (education level). Participants completed a measure of grit, Big Five Inventory, and provided information such as their age and education level. Hierarchical logistic regression revealed that grit accounted for significant variance in the prediction of educational attainment after controlling for age and Big Five traits, with individuals reporting more grit having achieved higher education levels than same age individuals with less grit.

Using a sample of African American males enrolled in a predominantly Caucasian university, Strayhorn (2014) examined variables that would predict academic success. Participants completed a measure of grit and the Black Male Student Success Questionnaire (BMSSQ). The BMSSQ is a measure of students' college experiences that includes aspects such as students' demographics, engagement, and traits. Students also reported their grades. Hierarchical regression analysis revealed that grit accounted for significant variance (6%) after controlling for impact of other predictors (age, college classification, educational aspirations, high school GPA, ACT score, and whether or not the student was a transfer student, in a fraternity, or was an athlete). The total model accounted for 24% of the variance in the prediction of academic performance. Relative to students with less grit, students higher in grit performed better in college. The author suggested that being persistent with long-term goals (i.e., grit) enables the students to be more academically successful.

Academic achievement is important to successful developmental outcomes. Although research has identified use of effective study strategies, high levels of meaning in life and grit as being associated with academic achievement, the relationships among academic achievement, study strategy use, meaning in life, and grit have yet to be examined. The purpose of the present study was to examine relationships among these variables, and investigate the role of study strategy use, meaning in life, and grit in the prediction of academic success. A sample of university students provided demographic information including grade point average and completed measures of study strategy use, meaning in life, and grit. It was expected that study strategy use, meaning in life, and grit would be positively correlated with academic success (i.e., grade point average). Moreover, it was predicted that grit would predict grade point average after controlling for study strategy use and meaning in life.

II. METHOD

Participants

Green (1991) suggested that assuming a medium effect size, the sample size (n) needed to conduct a regression analysis should equal at least 50 plus eight times the number of independent variables included in the analysis. As such, given 13 potential independent variables a sample size of at least 154 participants would be sufficient. Data utilized for the present study was drawn from an archival dataset. Participants included 249 students enrolled in psychology classes at a southeastern university in the United States. Of these, 67.1% identified as White, 22.5% African American, 2.0% Hispanic/Latino American, 1.6% Asian American/Pacific Islander, 2.0% Biracial/Multiracial, 2.8% Other, and 2.0% did not indicate their race/ethnicity. Age ranged from 18 to 40 (M = 19.11, SD = 2.20), with three participants not reporting their age. The sample was 34.5% male and 64.3% female, with 1.2% not reporting their sex. Participants' reported academic classifications were 66.3% freshman, 18.9% sophomore, 9.6% junior, 3.6% senior, and 1.6% did not indicate their classification. Participants received extra credit or course credit for participating in the study.

Measures

Learning and Study Strategies Inventory, Second Edition. The Learning and Study Strategies Inventory, Second Edition (LASSI-2; Weinstein & Palmer, 2002) is an 80-item self-report measure designed to assess students' study strategy use. Participants respond to items using a 5-point Likert response format, ranging from 1 (*Not at all typical of me*) to 5 (*Very much typical of me*), with half the items being reverse scored. Each scale score is computed by

summing its item responses, producing scores ranging from eight to 40 (higher scores indicate more effective use of the particular study strategy). The measure produces 10 scale scores (eight items each) representing 10 learning and study strategy categories (Time Management, Self-Testing, Test Strategies, Study Aids, Information Processing, Selecting Main Ideas, Concentration, Motivation, Attitude, and Anxiety). Correlations among the scales have been reported to range from .07 for Study Aids and Anxiety to .79 for Test Strategies and Selecting Main Ideas. The LASSI-2's scales have been reported to have good reliability, with the scales' alpha coefficients ranging from .73 for the Study Aids scale to .89 for the Selecting Main Ideas scale (Weinstein & Palmer, 2002). In the current study, the LASSI-2 scales' alpha coefficients ranged from a low of .64 (Study Aids) to a high of .86 (Concentration). See Table 1.

The Meaning in Life Questionnaire. The Meaning in Life Questionnaire (MLQ; Steger et al., 2006) consists of 10 items used to assess meaning in life including presence of meaning and search for meaning. A Likert-type response format is used. Items are rated from 1 (*Absolutely Untrue*) to 7 (*Absolutely True*). The measure produces two subscale scores (five items per subscale) by adding the item responses per subscale. The Presence subscale score reflects the extent to which respondents' sense that their lives are purposeful (higher scores indicate a greater sense of meaning in life). The Search subscale reflects the extent to which respondents are seeking something that will make their lives seem meaningful (higher scores indicate greater pursuit toward finding purpose in life). The two subscales have been reported to correlate marginally (e.g., r = -.19), suggesting that these two concepts are distinct. The MLQ has been reported to have good reliability (e.g., alpha coefficients of .86 for the Presence subscale and .87 for the Search subscale; one month test-retest reliability of .70 for the Presence subscale and .73 for Search) and validity (e.g., structural as well as convergent and discriminant validity) (Steger

et al., 2006). In the current sample, alphas were found to be .85 for the Presence subscale and .89 for the Search subscale.

Short Grit Scale. The Short Grit Scale (Grit-S; Duckworth & Quinn, 2009), an eight-item brief version of the Grit Scale (Grit-O; Duckworth et al., 2007), was utilized to assess grit, "perseverance and passion for long-term goals" (Duckworth et al., 2007, p. 1087). Item responses for the Grit-S follow a 5-point response format (i.e., 1 = *Not like me at all* to 5 = *Very much like me*), with half the items (Consistency of Interest subscale items) being reverse scored. Scores are produced by averaging item responses. Higher grit scores indicate a greater tendency to stay focused on goals across time, without losing interest, being distracted by other projects, or abandoning the goals and a greater tendency to work hard and complete tasks without being discouraged by obstacles. The Grit-S produces a total grit score (all eight items) and two factor scores (Consistency of Interest and Perseverance of Effort; each consisting of four items). The two factors have been found to be correlated (r = .59). Alpha coefficients for the total score ranged from .73 to .83. Alphas for the factor subscales ranged from .73 to.79 (Consistency of Interest) and .60 to .78 (Perseverance of Effort). Test-retest reliability (one year) for the Grit-S has been reported to be r = .68. The validity (e.g., structural, predictive, consensual) of the Grit-S has been supported (Duckworth & Quinn, 2009). The current study utilized Grit-S's total grit score, which had an alpha coefficient of .71 for the current sample.

Demographic Data Sheet. Participants were given a demographic data form to report their grade point average. The data form also asked for participants' age, sex, ethnicity, major, and academic classification.

Procedure

Data were collected as part of a larger study conducted at a southeastern university in the

United States. Participants were recruited via announcements online. Graduate and undergraduate research assistants conducted data collections in classroom settings, with up to 55 participants per session. Sessions were approximately an hour in duration, and participants earned an hour of psychology research participation course credit. Informed consent was provided to participants in accordance with the University Institutional Review Board policy. Participants could discontinue the study at any time without penalty. Measures' administration was counterbalanced.

Data Analyses

SPSS statistical software was used for data entry. Summary statistics were computed and distributions of variables were evaluated for skew and kurtosis. Mahalanobis distance was used to identify multivariate outliers. Descriptive statistics (e.g., means, standard deviations) and internal consistency (see Table 1) of variables relevant to the study were computed. A correlation matrix of variables was also computed. Variables significantly correlated with grade point average were entered into the hierarchical regression.

III. RESULTS

Data Screening

Before conducting analyses, data were checked for accuracy and screened for code violations, missing data, violations of statistical assumptions, and outliers. There were two code violations found. These values were deleted from the dataset. Data were examined for missing values and missing data were excluded from analyses. In order to examine for univariate outliers, data were converted to z-scores, and z-scores beyond +/- 3 were considered outliers. Five univariate outliers (one for GPA: value = 1.78, z = -3.22993; 1 for Information Processing: value = 12.00, z = -3.58644; 1 for Motivation: value = 13.00, z = -3.32740; and 2 for Presence: value = 10.00, z = -3.01744 and value = 11.00, z = -3.71957) were identified and removed from analyses. Distributions of variables were evaluated for skew and kurtosis, with no concerns being found (see Table 1). Upon examination of bivariate scatterplots of the variables, it appeared that linearity was acceptable. Mahalanobis distance was used to examine for multivariate outliers, with no multivariate outliers being found. Descriptive statistics and internal consistency of variables were calculated (see Table 1).

Correlations among Variables

Pearson correlations were computed for GPA and variables of interest and can be found in Table 2. With the exception of Information Processing (.10), Self-Testing (.10), and Search (-.06), all variables were significantly correlated with GPA, and ranged from .13 (Study Aids and GPA; Grit and GPA) to .41 (Motivation and GPA). Correlations were positive and in the low to moderate range. It appears that as students reported use of more time management techniques,

Table 1

Descriptive Statistics of the Variables of Interest

Variable	*M*	*SD*	Skew	Kurtosis	Alpha
Academic Success Variable					
GPA	3.31	.46	-.47	-.21	--
Study Strategy Variables					
Anxiety	23.72	7.28	-.16	-.60	.84
Attitude	30.68	4.82	-.61	-.11	.68
Concentration	24.51	6.48	-.02	-.59	.86
Information Processing	27.10	5.23	-.07	-.02	.77
Motivation	31.61	5.45	-.52	-.02	.83
Self-Testing	23.88	5.88	.23	-.08	.77
Selecting Main Ideas	27.21	5.99	-.10	-.34	.84
Study Aids	23.89	5.29	.04	-.16	.64
Time Management	23.39	6.61	.24	-.53	.83
Test Strategies	28.51	5.52	-.17	-.29	.78
Meaning in Life Variables					
Presence	27.33	5.52	-.81	.69	.85
Search	23.31	7.71	-.54	-.40	.89
Grit Variable					
Grit	3.39	.56	-.17	.04	.71

Table 2

Correlations between GPA and the Variables of Interest

Variable	ANX	ATT	CON	INP	MOT	SFT	SMI	STA	TMT	TST	PRS	SRC	Grit
GPA	.32**	.32**	.33**	.10	.41**	.10	.28**	.13*	.26**	.37**	.16**	-.06	.13*

Note. ANX = Anxiety; ATT = Attitude; CON = Concentration; INP = Information Processing; MOT = Motivation; SFT = Self-Testing; SMI = Selecting Main Ideas; STA = Study Aids; TMT = Time Management; TST = Test Strategies; PRS = Presence; SRC = Search.

*$p < .05$, one-tailed. **$p < .01$, one-tail.

test strategies, and study aids, being more effective at selecting main ideas, better concentration skills, more motivation, a more positive attitude toward school, less anxiety about school, a greater perception that their lives have meaning, and having more grit, they also reported higher GPA's.

Correlations among study strategy, meaning in life, and grit variables are displayed in Table 3. Most correlations were significant and ranged from -.33 (Search and Presence) to .75 (Selecting Main Ideas and Test Strategies). In general, as students reported using more of one study strategy, they also reported using more of another study strategy, greater perceived meaning in life, less search for meaning in life, and more grit; and as students reported higher perceived meaning in life they also tended to report less search for meaning in life and more grit.

Hierarchical Regression Analysis

Of 13 variables of interest, 10 were significantly correlated with GPA. Multicollinearity was suggested by the large correlation between Selecting Main Ideas and Test Strategies (r = .75). In order to address this problem, one of these variables (i.e., Selecting Main Ideas) was not included in the hierarchical regression analysis. It was decided that Test Strategies would be utilized in the analysis because it seemed to be more conceptually practical for the prediction of academic success compared to Selecting Main Ideas. That is, Selecting Main Ideas measures students' ability to identify key concepts and information that is important to study; whereas Test Strategies assesses the extent to which students are skilled at effectively using the information to be studied to prepare for academic tests/assignments and to demonstrate their knowledge when taking tests. In addition, prior to conducting the regression analysis, data were examined for residual outliers using the Casewise diagnostics program in SPSS. Six residual outliers were found and these cases were removed.

Table 3

Correlations among the Variables of Interest

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Anxiety	--	.35**	.58**	.03	.26**	.02	.59**	-.05	.27**	.67**	.16*	-.12	.30**
2. Attitude		--	.52**	.22**	.64**	.35**	.40**	.26**	.49**	.55**	.27**	-.15*	.34**
3. Concentration			--	.23**	.52**	.30**	.65**	.22**	.62**	.66**	.23**	-.13*	.56**
4. Information Processing				--	.36**	.60**	.27**	.44**	.23**	.14*	.11	.02	.14*
5. Motivation					--	.44**	.45**	.37**	.58**	.53**	.32**	-.11	.48**
6. Self-Testing						--	.28**	.56**	.44**	.23**	.18**	.02	.30**
7. Selecting Main Ideas							--	.18**	.32**	.75**	.15*	-.11	.38**
8. Study Aids								--	.43**	.08	.25**	.04	.27**
9. Time Management									--	.40**	.29**	-.14*	.49**
10. Test Strategies										--	.19**	-.12	.41**
11. Presence											--	-.33**	.27**
12. Search												--	-.10
13. Grit													--

*$p < .05$, two-tailed. **$p < .01$, two-tailed.

In order to determine the role of study strategy use, meaning in life, and grit in the prediction of GPA, a hierarchical regression was performed. Study strategy variables from the LASSI-2 (i.e., Anxiety, Attitude, Concentration, Motivation, Study Aids, Time Management, and Test Strategies) were entered in the first step (R = .554, R^2 = .307, Adjusted R^2 = .280, ΔR^2 = .307, ΔF (7, 182) = 11.522, p < .001), and accounted for 31% of variance in prediction of GPA. Presence (i.e., presence of meaning in life) was entered in the second step (R = .556, R^2 = .309, Adjusted R^2 = .278, ΔR^2 = .002, ΔF (1, 181) = .481, p = .489), but did not account for additional variance beyond that accounted for by study strategy use in the prediction of GPA. Grit was entered in the third step (R = .591, R^2 = .349, Adjusted R^2 = .316, ΔR^2 = .040, ΔF (1, 180) = 11.087, p = .001). Grit accounted for additional variance (4%) beyond that accounted for by study strategies and presence of meaning in life in the prediction of GPA. The combination of variables accounted for 35% of the variance in prediction of GPA. See Table 4 for a summary of the hierarchical regression results.

Table 4

Hierarchical Regression Analysis of the Study Strategy, Meaning in Life, and Grit Variables Predicting GPA

Variable	B	SEB	β	ΔR^2	ΔF
1st Step				.307	11.522+
ANX	.013	.005	.223*		
ATT	.000	.008	.000		
CON	.002	.007	.025		
MOT	.024	.007	.319+		
STA	.003	.006	.042		
TMT	-.007	.006	-.115		
TST	.014	.008	.179		
2nd Step				.002	.481
ANX	.013	.005	.218*		
ATT	.000	.008	-.004		
CON	.002	.007	.026		
MOT	.024	.008	.308**		
STA	.003	.006	.037		
TMT	-.008	.006	-.118		
TST	.014	.008	.184		
PRS	.004	.005	.046		
3rd Step				.040	11.087+
ANX	.011	.005	.198*		

Variable	B	SEB	β	ΔR^2	ΔF
ATT	-.004	.008	-.047		
CON	.008	.007	.120		
MOT	.029	.008	.384^{+}		
STA	.004	.006	.053		
TMT	-.006	.006	-.090		
TST	.016	.008	.206*		
PRS	.006	.005	.072		
Grit	-.189	.057	-.261^{+}		

Note. ANX = Anxiety; ATT = Attitude; CON = Concentration; MOT = Motivation; STA = Study Aids; TMT = Time Management; TST = Test Strategies; PRS = Presence.

*$p \leq .05$; **$p \leq .01$; $^{+}p \leq .001$.

IV. DISCUSSION

The current study sought to examine the role of study strategy use, meaning in life, and grit in the prediction of academic success (i.e., GPA). Results revealed that study strategies explained a considerable amount (31%) of variance in the prediction of GPA. More specifically, Anxiety and Motivation demonstrated significant relationships with GPA. The association between study strategies and academic achievement was consistent with previous research (Albaili, 1997; Alkhateeb & Nasser, 2014). The current finding supports the notion that study strategies facilitate learning (Gettinger & Seibert, 2002; Nist & Holschuh, 2000; Weinstein et al., 2000; Weinstein & MacDonald, 1986). It seems that being less anxious about school performance, and having high levels of motivation to work diligently on academic assignments enable students to perform well in school.

Several prior studies have suggested that meaning in life is associated with several desirable learning outcomes. These include students' focus on being intelligent, responsible, disciplined, using time in a structured and purposeful manner, academic engagement, and academic achievement (Bond & Feather, 1988; Greenway, 2006; Nackord, 1983; Simmons, 1980).

Surprisingly, in the current study after controlling for study strategy use, presence of meaning in life did not account for significant variance in the prediction of GPA. The current sample was predominantly composed of freshmen. For many of these students it is likely that moving to the university campus was their first time living away from home and family. This new environment is associated with a variety of challenges and several associated new life

demands including establishing a sense of personal autonomy, a sense of belonging, as well as career considerations (e.g., deciding on a major). It is possible that failure to find a relationship between presence of meaning in life and GPA may be due to participants working to develop greater self- awareness. That is, trying to realize their place in the world and establish values that will put them on a path toward making their lives increasingly meaningful (i.e., meaning in life). It might prove beneficial for future work to include a broader cross-section of student participants.

Previous research suggests that grit may be an important variable contributing to individuals' academic success. Duckworth et al. (2007) found that grit was associated with GPA of college students at an Ivy League university. Similarly, Strayhorn (2014) reported that grit predicted grades in a sample of African American males enrolled in a predominantly Caucasian university. Moreover, grit has been shown to predict basic training retention, first year military performance, and first year academic performance in cadets at West Point (Duckworth et al., 2007; Maddi et al., 2012). Although grit accounted for variance in the prediction of GPA, it accounted for a relatively small proportion of the variance (4%), and was a negative predictor (although grit showed a small positive relationship with GPA in the bivariate correlations). The change from positive to negative suggests that grit appears to be a suppressor variable in this analysis, which indicates that grit has a very complicated relationship with the other predictors. Additionally, given the small amount of variance accounted for by grit, it appears that study strategies are likely the major factor in prediction of GPA.

Limitations and Future Research

The present study's sample consisted of students in psychology courses at a southeastern university. The sample was predominantly White, female, and freshman. Given the sample's

demographics, regional or cultural factors may have influenced findings. The present sample's lack of diversity may limit generalizability of these findings. It would be beneficial to reproduce these findings with more diverse samples. Furthermore, self-report measures were used and are subject to error due to poor recall and biases in participants' self-perceptions. Social desirability may have also influenced how individuals responded, although instructions emphasized honesty in responding. Grade point average was also a self-report variable. To strengthen conclusions obtained in the current study, more direct assessment of GPA (e.g., transcripts) should be considered.

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